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### (54) Interior body for a helmet

Innenauskleidung eines Helmes  
Garniture intérieure de casque

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US-A- 2 709 810                    US-A- 3 366 971  
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EP 0 792 592 B1

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**Description****BACKGROUND OF THE INVENTION****TECHNICAL FIELD OF THE INVENTION**

[0001] The present invention relates to an interior body for mounting onto an inner side of an impact absorbing liner in a helmet, and in particular relates to an interior body to be mounted attachably and detachably onto an inner side of an impact absorbing liner of the helmet.

**DESCRIPTION OF THE EARLIER TECHNOLOGY**

[0002] A known safety helmet for riding on a vehicle is fitted with an impact absorbing liner comprising styrene foam or the like on an inner side of an outer shell. An interior body (cushion pad) is formed by covering a surface of a cushion material made of foamed urethane or the like with a cloth agreeable to the skin and is fixedly adhered at a predetermined portion on an inner side of the impact absorbing liner.

[0003] With a safety helmet of this kind, the interior body is liable to stain by sweat, dust or the like due to its environment of use.

[0004] Therefore, in recent times there have been developed various kinds of interior bodies which are attachable to and detachable from the impact absorbing liner in order that to keep clean the interior bodies can be kept clean by washing them. Also this means the interior bodies may be adjusted to snugly fit to the sides of the human head of the user.

[0005] The interior body, is constituted by forming a thin plate core material of a rigid synthetic resin in a ring-like shape and by stitching thereto an interior member (pad) which is for direct contact with the human head and which comprises a cushion material covered by a cloth. Further, as a method of fitting the interior body attachably and detachably to and from the inner side of an impact absorbing liner, there has been adopted a method wherein snap fasteners are attached to the inner side face of the impact absorbing liner and mating snap fasteners are attached to the interior body (Japanese Utility Model Publication No. Hei 6-30810) or the like.

[0006] When such a helmet is worn, the touch on the skin is hard due to the presence of the rigid core material and further, the interior body is larger than the core material, the difference causes in the compression of the interior body, which gives a strange feeling.

[0007] Further, it has been proposed to provide notches at portions of the lower side edge of the outer periphery of the impact absorbing liner as an attaching means for an interior body the interior body being fixed by the insertion of projection pieces connected to the interior body between the outer shell and the impact absorbing liner. (Japanese Utility Model Laid-Open No. Sho

62-70130).

[0008] In this arrangement, although the problems of hardness of touch on the skin and the strange feeling in wearing the helmet may be resolved, attachment and detachment of the interior body is troublesome and further, the safety of the helmet is reduced due to the notching of portions of the impact absorbing liner.

[0009] In another method of fitting an attachable and detachable interior body which may conceivably not have a core material to the inner side face of the impact absorbing liner, there may be used a velvet type fastener. However, in this case the interior body is liable to shift, which results in an unsatisfactory feeling in use and further lacks durability. The rigidity of the material body in the plane direction may be increased by increasing the thickness of the interior body, but the thickness of the interior body can be increased only to a limited extent having regard to how the helmet will feel in use.

[0010] United States Patent No 3471865 discloses a helmet provided with ear protection pads which are fitted to the inside of extension pieces of a rigid shell of the helmet. The pads are mounted on the shell extensions so as to be removable therefrom for cleaning and replacement.

[0011] United States Patent 4023213 discloses a shock absorbing system for a helmet which comprises a band of sheet materials welded together to form pockets which are filled with sponge material. The pockets are sealed except for restricted communication passages between respective pockets, so that if one pocket is compressed by the helmet receiving an impact, then air is displaced from one pocket to another through the restricted communication passage, whereby the system performs efficient shock absorption.

[0012] Neither of these patents deals with an interior body of the nature of the present invention, which is one in which there are rigid core materials used in conjunction with cushion pads.

**40 SUMMARY OF THE INVENTION**

[0013] The present invention has been made with the above-described problems of the conventional technology in mind and it is an object of the present invention to provide an interior body with pads having minimum thickness, the interior body being capable of ensuring improved touch on the skin with the strange feeling or compromising safety.

[0014] In order to achieve the above-described object, according to the present invention there is provided an interior body of a helmet comprising a plurality of pads and rigid core materials, the plurality of pads being formed in a ring like shape, so that the inner sides of the pads are for fitting round the head of the user, characterized in that:

end portions of the pads are stitched to end portions of the rigid core materials so that no core materials are present on the outer sides of the pads.

[0015] Preferably, each pad comprises an assemblage of a stretchable cloth for direct contact with a human head pasted on one side face of a cushion material, a nonstretchable cloth or film pasted on other side face of the cushion material said assemblage being cut in a predetermined shape.

[0016] The stretchable cloth has an excellent skin touch feeling, and may be for example, french pile made of nylon which has an excellent touch feeling.

[0017] The nonstretchable cloth may be plane weave fabric made of nylon which is pasted and cut such that the fiber directions thereof are biased in respect of X-axis (horizontal axis = longitudinal direction) and Y-axis (vertical axis) in the plane of the pad, or it may be a film made of resin with perforations.

[0018] The predetermined shape of the pads to fit at the sides of the head of the user is a modified trapezoidal shape (broad bean shape) as shown by Fig. 1. A rectangular shape, a square shape or the like may be used for others of the pads.

[0019] Further, the pads of the interior body constituted as described above are arranged in the peripheral direction at predetermined intervals and end portions in the peripheral direction of the pads are connected to end portions of the rigid core materials which are longitudinal and, which are arranged side by side in parallel to each other and extend from a forward position toward a rearward position in relation to the user's head.

[0020] The shape formed by the pads of the interior body may be a ringlike shape.

[0021] By the above-described constitution, each pad which is nonstretchable at least in respect of the plane direction (X, Y directions), providing rigidity and shape maintaining performance. Further, the interior body preferably is capable of being fixed in a predetermined position on the inner side of the impact absorbing liner of a helmet by connecting distal ends of the core materials to the impact absorbing liner.

[0022] Furthermore, the ends of the core materials serve to space the pads and define groove between the pads, which grooves effectively function as vent grooves.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0023]

Fig. 1 is a perspective view showing a pad for an interior body according to the present invention;

Fig. 2 is a partially broken plane view of the pad;

Fig. 3 is a perspective view showing an interior body constituted by connecting the pads;

Fig. 4 is a longitudinal sectional view showing a state where the interior body is attached to a helmet;

Fig. 5 is an enlarged sectional view taken along a line W-Y of Fig. 4; and

Fig. 6 is a perspective view showing a helmet having mating snap fasteners for fixing an interior body.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT (S)

[0024] An explanation will be given of an embodiment of the present invention with reference to the drawings as follows.

[0025] Fig. 1 and Fig. 2 illustrate a pad for an interior body. The pad A is formed in a predetermined shape by pasting a cloth 2 for direct contact with a human head onto a side face of a cushion material 1, pasting a nonstretchable cloth 3 on the other side face of the cushion material and stitching together the peripheries of the cloth 2 and the cloth 3.

[0026] The cloth 2 is a pile cloth or the like which is agreeable to the skin touch and is stretchable. The cushion material is foamed polyurethane or the like.

[0027] The pad is formed in a modified trapezoidal shape as illustrated by Fig. 1, or a substantially square shape similar to those of pads arranged at the forward and rearward portions of the interior body illustrated by Fig. 3.

[0028] The cloth 3 mentioned above is a plane weave fabric made of nylon and is pasted on the cushion material 1 such that it is biased in respect of X-axis direction (horizontal direction) and Y-axis direction (vertical direction) of the cushion material 1 whereby the interior body is resistant to bending in Y-axis direction although a more or less stretchability is secured in respect of the horizontal direction (X-axis direction). Thereby, the pad A is provided with a rigidity in X-axis direction (horizontal direction) and Y-axis direction (vertical direction).

[0029] Fig. 3 illustrates an interior body B including pads A. The interior body B is formed so that the pads form a ring-like shape. This is achieved by connecting the distal ends, in the horizontal direction, of the pads A to the ends of longitudinal core materials 4 and 4' each formed by a rigid band plate made of a synthetic resin.

[0030] The core materials 4 and 4' are formed in a circular arc shape and are arranged so as to lie in use in alignment with the helmet from a forward position toward a rearward position thereof. The circular arc shapes respectively face outwardly, the pads A are arranged between the ends of the circular arcs of the core materials 4 and 4', and the distal ends of the pads are stitched thereto. The pads A are also arranged between both of the core material 4 and the core material 4' and the distal ends are stitched thereto whereby the pads in the interior body B form a ring-like shape.

[0031] Accordingly, no core materials are present (as they are in the conventional helmet) between the impact absorbing liner C and the human head at the rear sides of the pads A and therefore, the touch feeling of the pads

which are brought into contact with the human head, is given by the cushion material per se, whereby in wearing the helmet the user experiences a soft feeling.

[0032] Incidentally, also a pad (crown pad) A' which is for contact with the top of the human head is stitched to the core material 4 and the core material 4' to span the core material 4 and the core material 4'.

[0033] Further, snap fasteners 5 for fixing the interior body B to the inner side of the impact absorbing liner C are fixed to the core materials 4 and 4'.

[0034] The interior body B can be fixed attachably and detachably to and from the impact absorbing liner C by fittedly engaging the snap fasteners 5 with mating snap fastener members 6 provided on the inner face of the impact absorbing liner C.

[0035] Incidentally, the core materials 4 and 4' are provided for connecting the pads A and forming them in a ring-like shape and therefore, the core materials 4 and 4' are made as small as possible.

[0036] The interior body B as described above can be fixed to the inner side of the impact absorbing liner C of the helmet with certainty by the mating snap fastener members 6 and the snap fasteners 5 shown by Fig. 4. Further, in the attached state the bending deformation of the pads A in X-axis direction and Y-axis direction is restrained by the cloth 3 and accordingly, the interior body B where the pads A are connected by the core materials 4 and 4', secures the predetermined shape. Also, the portions of the core materials 4 and 4' for connecting the pads A create a groove-like shape and therefore, air vent operation is effectively conducted whereby a less muggy interior body can be provided.

[0037] According to the pad for the interior body of the present invention, the rigidity in respect of the plane direction (X-axis, Y-axis directions) may be provided while the thickness can be kept to a minimum and accordingly, a pad for an interior body is provided which is excellent in shape and maintains performance.

[0038] Further, as no core materials are present on the rear side of the pad, there is no strange feeling to the user as happens when core materials are brought into indirect contact with the human head. There is, due to the cushion material forming the constituent member of the pads, and by compression of the pads when the interior body fitted to the human head, a soft touch to the human head. Furthermore, the core materials constitute grooves between the pads and therefore, the connecting portions of the core materials function as vent grooves whereby an interior body excellent in vent function is provided.

[0039] Having described specific preferred embodiments of the invention with reference to the accompanying drawings, it will be appreciated that the present invention is not limited to those precise embodiments, and that various changes and modification can be effected therein by one of ordinary skill in the art without departing from the scope of the invention as defined by the appended claims.

### Claims

1. An interior body (B) of a helmet comprising a plurality of pads (A) and rigid core materials (4,4'), the plurality of pads (A) being formed in a ring like shape, so that the inner sides of the pads (A) are for fitting round the head of the user, characterized in that:  
end portions of the pads are stitched to end portions of the rigid core materials (4,4') so that no core materials are present on the outer sides of the pads (A).
2. An interior body of a helmet according to claim 1, characterized in that:  
each pad (A) comprises an assemblage of a stretchable cloth (2) for direct contact with a human head pasted on one side face of a cushion material (1), a nonstretchable cloth or film (3) pasted on other side face of the cushion material (1) said assemblage being cut in a predetermined shape.
3. An interior body (B) of a helmet according to claim 2, wherein in each said pad (A) the cloth (3) disposed on the said other side face is a plane weave fabric pasted and cut such that fiber directions thereof are biased in respect of X-axis and Y-axis directions of the pad (A).

### Patentansprüche

1. Innenauskleidung (B) eines Helmes, der eine Mehrzahl von Polstern (A) und steife Kernmaterialien (4, 4') umfasst, wobei die Mehrzahl der Polster (A) zu einer ringartigen Form geformt ist, so dass die Innenseiten der Polster (A) zum Anlegen um den Kopf des Benutzers herum sind, dadurch gekennzeichnet, dass Endteile der Polster an Endteilen der steifen Kernmaterialien (4, 4') angenäht sind, so dass keine Kernmaterialien an den Außenseiten der Polster (A) vorhanden sind.
2. Innenauskleidung eines Helmes nach Anspruch 1, dadurch gekennzeichnet, dass jedes Polster (A) Folgendes aufweist: eine Anordnung eines dehbaren Stoffes (2), der auf eine Seitenfläche eines Dämpfungsmaterials (1) aufgeklebt ist, für den direkten Kontakt mit einem menschlichen Kopf, einen nicht dehbaren Stoff oder eine nicht dehbare Folie (3), der/die auf die andere Seitenfläche des Dämpfungsmaterials aufgeklebt ist, wobei die genannte Anordnung auf eine vorbestimmte Form geschnitten ist.

3. Innenauskleidung (B) eines Helmes nach Anspruch 2, bei dem der auf der genannten anderen Seitenfläche angeordnete Stoff (3) bei jedem genannten Polster (A) ein Glattgewebe ist, das so aufgeklebt und zugeschnitten ist, dass seine Faserrichtungen im Verhältnis zur Richtung der X-Achse und der Y-Achse des Polsters (A) schräg sind. 5

**Revendications**

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1. Garniture intérieure (B) d'un casque comprenant une pluralité de tampons (A) et de matériaux de noyau rigides (4, 4'), la pluralité de tampons (A) étant formée selon une forme en anneau, de sorte que les faces internes des tampons (A) soient destinées à s'ajuster autour de la tête de l'utilisateur, caractérisée en ce que : 15

les sections d'extrémité des tampons sont coussues sur les sections d'extrémité des matériaux de noyau rigides (4, 4'), de sorte qu'aucun matériau de noyau ne soit présent sur les faces externes des tampons (A). 20

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2. Garniture intérieure d'un casque, selon la revendication 1, caractérisée en ce que :

chaque tampon (A) comprend un assemblage de tissu extensible (2) destiné à être en contact direct avec la tête de l'utilisateur et qui est collé sur l'une des faces latérales d'un matériau d'amortissement (1), une pellicule ou un tissu non-extensible (3) qui est collé sur l'autre face latérale du matériau d'amortissement (1), ledit assemblage étant coupé selon une forme pré-déterminée. 30

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3. Garniture intérieure (B) d'un casque, selon la revendication 2, dans laquelle, sur chacun desdits tampons (A), le tissu (3) placé sur ladite autre face est un matériau tissé uni qui est collé et coupé de telle sorte que le sens de ses fibres est orienté par rapport à l'axe X et à l'axe Y du tampon (A). 40

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FIG. 1

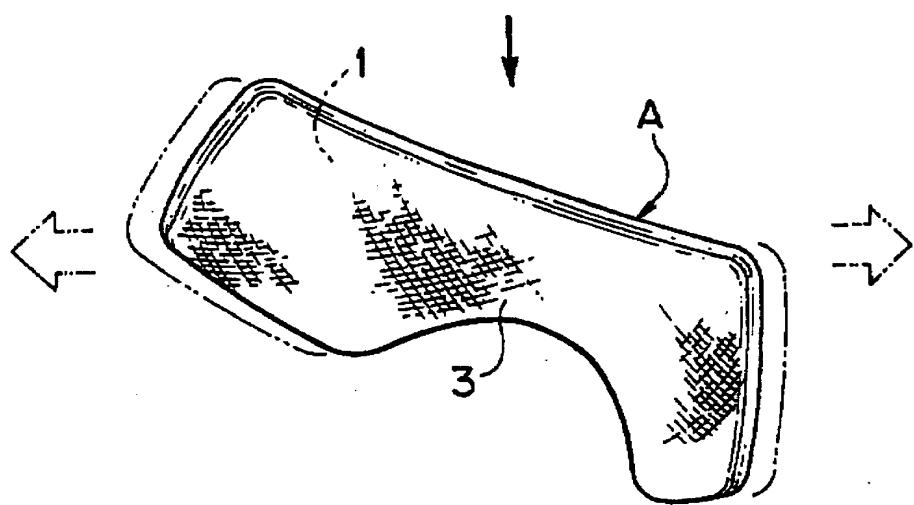


FIG. 2

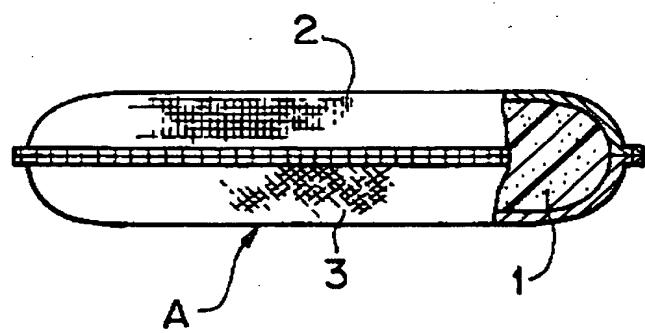


FIG. 3

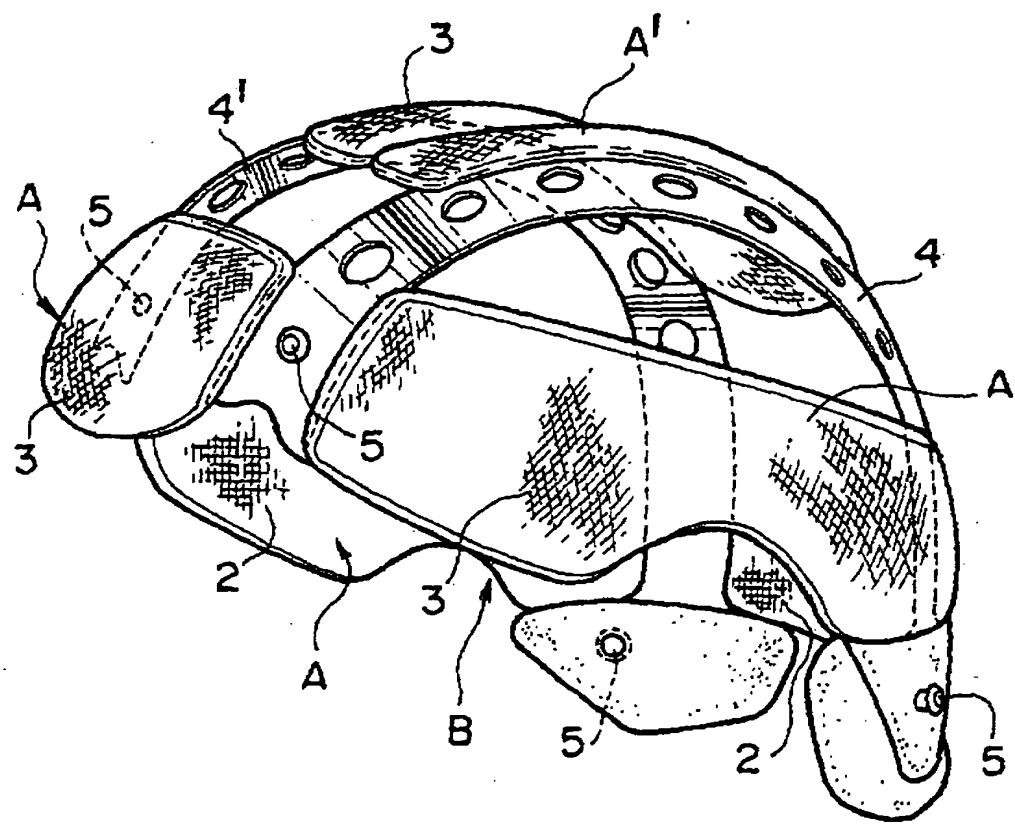
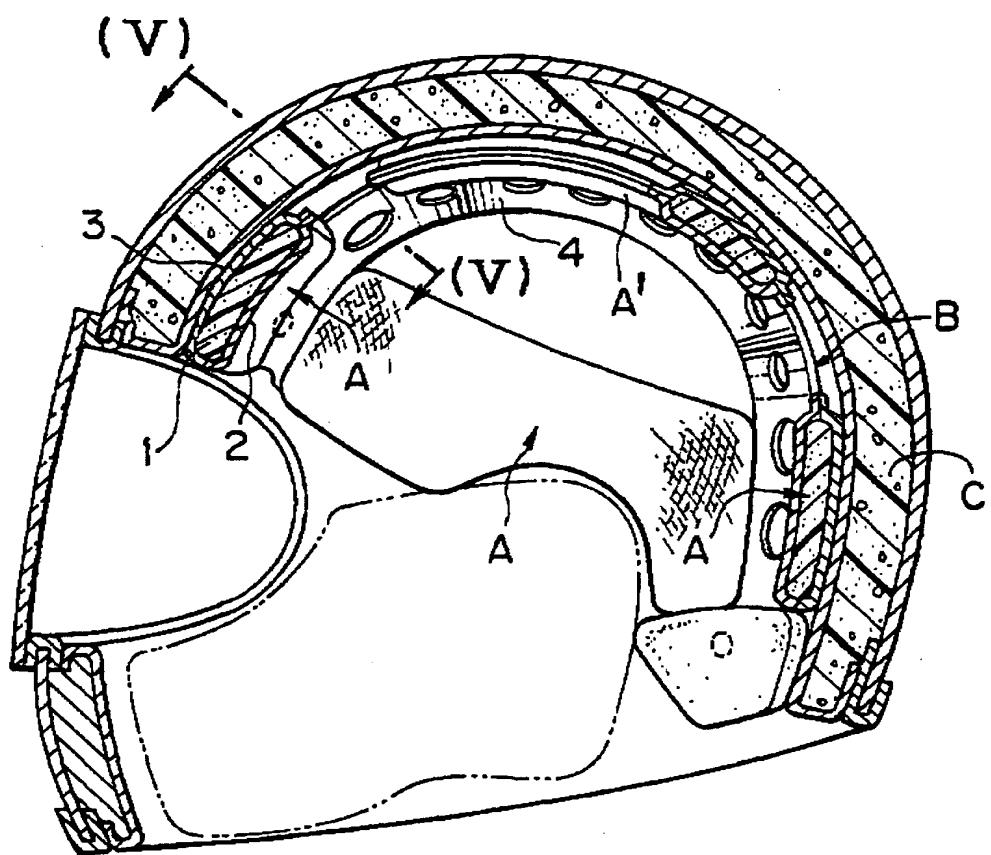
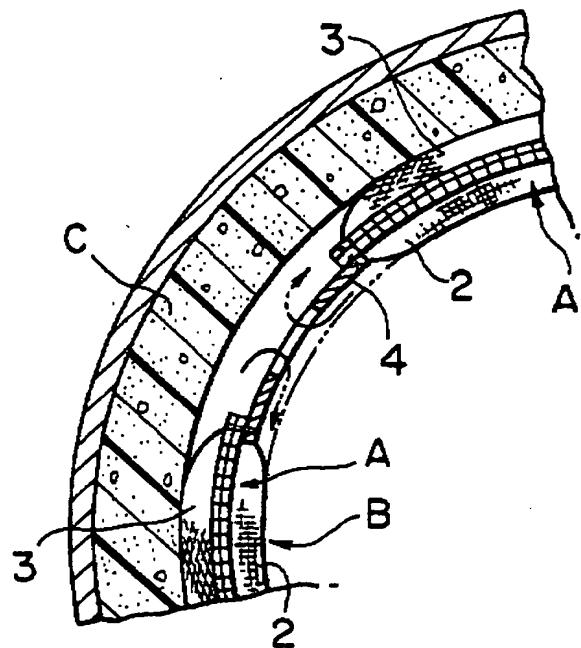


FIG. 4



**FIG. 5**



**FIG. 6**

